

Contribution of Climate Variability and Drought Events on Water Crisis of Urmia Lake, and Innovative Solutions for Water Crisis Management in Its Basin.

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Abstract

Urmia Lake is considered the third super-saline lake and one of 20 greatest lakes in the world. This lake regarding its climate, ecology, environment and economy is among valuable natural resources of Iran. The lake has been extremely faced to the water crisis/water level decreasing through the last 15 years (especially in the last few years), as most of rare fauna and flora species around the Urmia lake basin as well as social-economic affairs of the habitants in surrounding area of the lake have been seriously endangered.

Hence through this investigation in order to find the climate-impact on water level fluctuation of the Lake, we intended to analyze precipitation, temperature and evaporation over the basin in relation to water-level fluctuations of the lake in annual and monthly scales. Furthermore, droughts that aggravate water crisis in the basin, along with the dominant atmospheric patterns over the region in two samples of wet and dry periods have been studied. Finally after considering the anthropogenic impacts and other water challenges in the basin, some solutions/pathways for water crisis management are recommended.

The derived results indicated extension and exacerbation of warming and precipitation deficit over the basin especially through the recent 15 years. Nonetheless, the intensity of water-level decreasing of

Urmia lake is more harsh than the variations of climatic factors over the basin, so there is not more significant correlation obtained between them (the lake's water-level and climatic factors fluctuations). In total, it is given, the climate change and drought extension in the region could exacerbate the water crisis of the lake, but rising of anthropogenic factors in the study area such as agricultural and industrial plans which resulted in over-exploiting water resources in the basin especially during the last 15 years might have a more effective role in this regard.

Allocating a given right of water from the main rivers of the basin to cover ecological needs of Urmia lake in particular through drought periods could be recommended as an operational way to mitigate this water crisis.

Keywords

Urmia Lake basin, water crisis, climate variables, drought extension, anthropogenic factors, crisis management solutions.